

APPLICATION FOR UNITED STATES LETTERS PATENT

Title: All-Terrain Welding Cart

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ALL-TERRAIN WELDING CART

TECHNICAL FIELD OF THE INVENTION

The present invention relates generally to welding equipment carts and more specifically to a new and improved all-terrain four wheel cart having an independent suspension system capable of holding equipment and tools. The cart of the present invention is capable of traveling on level and uneven surfaces where standard welding carts with wheels cannot presently go.

BACKGROUND OF THE INVENTION

It can be appreciated that welding carts have been around for years. These carts typically have two wheels and some have compartments for holding welding machinery, tools and gas/oxygen bottles.

Traditional welding carts are two-wheeled, are pulled in and around a welding shop or transported inside the bed of work trucks and on utility-type towing trailers.

An example of a prior art cart is shown in US Patent 6,116,623 with the title "Dual Cylinder Cart With Firewall Divider" issued September 12, 2000 to Frank S. Salvucci. While being functional for its intended purpose which is to provide a firewall for two cylinders, it has not been designed to travel across rocky terrain, lacks independent suspension and makes no provision for dedicated tool holders nor is there space for hauling equipment.

US Patent 6,109,644 "Utility Wagon" issued August 29, 2000 to Lem L. Cox discloses a wagon having a universal base upon which can be mounted different chassis, it is not specifically designed for a gas cylinder or welder unit setup. This wagon has no rotating base under and supporting the welding unit nor are there dedicated tool holders or independent suspension. It would not be workable for the present invention.

US Patent 5,693,286 "Cart Mounting A Welding Torch Or Cutting Torch" issued December 2, 1997 to Isamu Htanaka, Yariaki Kaneko and Kenichi Nezu shows a cart that has been designed to run on a guide track and not specifically designed to hold a gas cylinder nor is there independent suspension allowing it to traverse rough terrain.

US Patent D322,501 "Welding Cart" issued December 17, 1991 to Timothy J. Legault is an all-purpose carrying cart that is workable for the purpose intended but does not have four wheels, independent suspension, nor the ability to carry a bottle and welding unit. It would not in its present state be capable of traveling on rough terrain.

US Patent 4,778,154 "Welding Torch Carriage" issued October 18, 1988 to Crespin Cortez, Jr. discloses a cart specifically designed to hold a welding torch in a chosen welder line. Though workable for its intended purpose, it would not be workable when compared to the present invention since the carriage does not have independent suspension, lacks four wheels, makes no provision for a gas bottle and is therefore limited to the purpose it was designed for.

US Patent 3,174,736 "Carriage For Cutting Torches" issued April 20, 1962 to E.H. Cameron discloses a cart that has been specifically designed to hold a welding torch in a fixed carriage. In contrast to the present invention, it provides no space to carry a gas bottle, is limited to where it can be used, nor does it have four wheels with pneumatic tires or an independent suspension which limits it's ability to be moved over rough terrain, nor does it provide equipment storage area and tool holders.

To overcome the above mentioned inadequacies, the present invention has an independent suspension system making the cart capable of traveling across a variety of terrains either by being manually pulled by a handle connected to the suspension system making it easy to control cart direction or by an interchangeable tow hitch which can replace the manual towing handle allowing the cart to be mounted onto a tow receiver and quickly driven away. Due to the cart's ground clearance, size of wheels and pneumatic tires, it can travel most terrains usually unavailable to standard welding carts.

In these respects, the present invention substantially departs from conventional concepts and designs shown in the prior art, and in so doing the present invention provides a new and unique invention primarily developed to provide independent suspension and steering capability.

OBJECTS OF THE INVENTION

The primary object of the present invention is to provide an all-terrain welding equipment cart to overcome shortcomings of the prior art in that it has a front independent suspension system consisting of a floating axle which has a limit stop device to prevent the axle from excess travel in a downward direction and which is independently supported by springs, enabling it to traverse over a variety of terrains where four-wheel vehicles are required to go such as at sporting events and track meets without sacrificing stability. The cart is suitable for use on construction sites and other areas outside the general welding / fabrication shop.

Another object of the present invention is to provide a welding cart that has suspension springs and steering tie rods to aid its ability to conquer rough terrain and ease of steering.

Another object of the present invention is in the provision of skid plates to protect steering axles from ground debris damage.

Another object of the present invention is to provide a suspension system with a towing/steering extension which can for example be a handle allowing the cart to be pulled manually or the extension can be a standard towing hitch for attachment to a vehicle or the like.

It is a further object of the invention to provide an all-terrain welding equipment cart to be of sufficient height to clear obstacles such as rocks that would normally stop welding equipment carts.

A further object of the present invention is to provide a sturdy cart capable of hauling heavier welders and large or small bottles while providing a storage area and several hooks for tools and equipment to be stored.

Still another object of the present invention is to provide an interchangeable one-handed hauling handle easily replaced with a towing hitch allowing the cart to be towed over a variety of terrains.

Yet another object of the invention is to provide a rotatable welder table allowing welding personnel to turn a tube under the welding table holding the welding unit to a desired position after which it is locked into position.

Another object of the present invention is to provide an independent flux/spray bottle container holder attached to the welding gas bottle holding frame.

Another object of the present invention is to provide a cage-like frame in which a gas bottle is held having a removable retaining strip along its uppermost rim acting like a gate when opened allows entry/exit of cylinder bottle and to which "EII" type brackets are affixed for hanging equipment.

Another object of the present invention is to provide a locking device attached to the rotating base holding the welding unit and when it is loosened permits the table to rotate to a desired angle providing for ease of operation.

Another object of the present invention is to provide large pneumatic tires mounted onto oversized wheels connected to axles and suspension arms the lower portion of which are protected by skid plates on both front and rear providing protection from ground obstacles.

Another object of the present invention is to provide the exchange of either manual towing with a handle or vehicular towing with a hitch. To exchange from one to the other a pin located just below the upper end of the towing tongue is removed so handle or hitch can be extracted or inserted.

Another object of the present invention is a cart to be used as a rapid emergency response welding unit capable of traversing adverse terrain where welding work is urgently required and where there is no time to off-load equipment then re-load cart into the back of a truck or utility vehicle.

SUMMARY OF THE INVENTION

In view of the foregoing disadvantages inherent in the known types of prior art, the present invention provides a more stable and versatile base platform for traversing adverse terrain usually subjecting such carts to severe shock. The ease of towing either by hand or by a towing hitch facilitated by not only independent suspension axles but also a definitive steering system wherein the front wheels pivot at the end of floating axles providing more accurate steering without interfering with the suspension system.

This cart provides a compact platform for welding equipment needed on or off-site and is capable of being towed either by hand or by a vehicle and in an emergency situation it can be towed directly to the site via the hitch or handle. The platform supports both gas and electric welding equipment.

The rear end of the cart supports the gas bottle retained within a frame made of a durable strong material. The front end of the welding gas bottle holding frame supports two tool holders and a flux/spray container holder. The sides and back end of the frame support "E" brackets for holding cables and hoses. The rear strip of the top portion of the gas bottle frame is removable to facilitate the exchange of gas bottles.

The front end of the cart consists of a base platform to hold equipment and a tube protruding upwards to a rotating table which can be locked in position by a locking mechanism mounted in the tube under the table holding the welding machine.

Under the base platform is both front and rear suspension. The rear suspension consists of two floating axles supported by two springs per axle and in between and under the axle mount is a skid plate to prevent damage to the axles. The axle mount also contains a limit stop for each suspension arm to prevent loss of the springs.

The front suspension system consists of two floating suspension arms supported by one spring per arm and similar to the rear suspension it includes mount, arm limit stops, and a skid plate. Aft of the suspension system is a towing extension which is pivoted from a point forward of the aft suspension system. The front end of the extension arm supports a pivot point for the towing tongue on the top. Under that pivot point two tie rods are attached to the pivoting extension arm that steers or turns the wheels as the extension arm and towing tongue are horizontally turned left/right.

DESCRIPTION OF THE DRAWING FIGURES

A complete understanding of the present invention may be obtained by reference to the accompanying drawings, when considered in conjunction with the subsequent, detailed description, in which:

Figure 1 shows an overall view of the cart of the present invention.

Figure 2 shows a right hand view of the welding cart of the present invention.

Figure 3 shows a left hand view of the welding cart of the present invention.

Figure 4 shows the topside view of the welding cart of the present invention.

Figure 5 shows the underside of the welding cart of the present invention.

Figure 6 shows a front end view of the welding cart of the present invention.

Figure 7 shows the back end view of the welding cart of the present invention.

Figure 8 shows a front view of the front suspension system of the welding cart of the present invention.

Figure 9 shows a cross section of the front suspension of the welding cart.

Figure 10 shows a rear view of the rear suspension of the welding cart.

Figure 11 shows a cross-sectional view of the rear suspension of the welding cart.

Figure 12 shows the retaining mechanism for the gas welding bottle.

Figure 13 shows a portion of the gas bottle holding frame.

Figure 14 shows the retaining mechanism for the gas welding bottle viewed from above.

Figure 15 shows a side view of the retaining mechanism for the gas welding bottle.

Figure 16 shows where the retaining mechanism for the gas welding bottle, shown in figure 15, is inserted into.

Figure 17 shows where the retaining mechanism for the gas cylinder goes into the cart of the present invention.

Figure 18 shows a side view of the top of the welding gas bottle holding frame.

Figure 19 shows a front view of the top of the welding gas bottle holding frame.

Figure 20 shows a side view of the welding flux container/spray bottle holder.

Figure 21 shows a top view of the welding flux container / spray bottle holder.

Figure 22 shows a front view of the handle for manual operation of the towing / steering arm.

Figure 23 shows a side view of the handle for manual operation of the towing / steering arm.

Figure 24 shows the locking pin for interchanging the handle and hitch fitted at the top end of the towing / steering arm.

Figure 25 shows the towing / steering arm

Figure 26 shows a side view of the towing hitch for the welding cart of the present invention.

Figure 27 shows an upper view of the towing hitch for the welding cart of the present invention.

For purposes of clarity and brevity, like elements and components will bear the same designations and numbering throughout the FIGURES.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION

With reference to the drawings, a detailed description of the invention and its use is as follows.

An overall view of the welding cart of the present invention is shown in figure 1. The base of the cart is referenced by numeral 2 which sits upon pneumatic tires mounted on wheels 40. At the front end of the cart is a towing / steering arm 28 and at the upper end of this arm 28 is a handle 30 for the manual operation of the towing / steering arm 28 which can be interchanged with a towing hitch 70 (not shown in this figure). At the front end of the cart, extending up from the base 2, is a rotating platform 6 designed to hold an electric welding machine 10. At the rear end of the cart is mounted a welding gas bottle holding frame 4 which holds a welding gas bottle 8. Hooks or similar may be placed around the upper end of the welding gas bottle holding frame 4 to hold welding cables and / or hoses 12. Also provided is a welding flux container holder / spray container holder 20 which sits at the upper end of the welding gas bottle holding frame 4. The rotating platform 6 (on which the welding unit sits) has two bolt holes in the front (facing the handle) and one bolt hold in the back (facing the gas bottle) shown in the area of numeral 38. Once the welding unit is placed on the rotating platform, the bolts are put through the holes thereby affixing themselves to the outside of the welding unit to hold it in place on the rotating platform.

Right and left hand views of the welding cart respectively are shown in figures 2 and 3. These figures show "E11" type brackets 24 which are used to hang welding cables and / or hoses and a removable retaining strip 26 attached to the welding gas bottle holding frame 4 for ease of bottle replacement, this strip can be removed to insert a bottle and then replaced afterwards. A tool holder bracket 22 is placed on the upper end of the frame 4. On the rotating platform 6 is shown a lower mounting tube 14 for the platform 6, the upper

internal mounting tube 16 is fitted into the lower mounting tube 14 and a lockable handle 18 for the rotating platform 6 is shown in it's preferred position. The platform 6 has "U" brackets 36 for "connected" or "in use" welding machine cables and a welding machine back stop 38 mounted on the upper surface of the rotating platform 6 onto which the welding machine is bolted to prevent the welding machine from slipping off the platform 6. Reference numeral 32 shows a locking pin for interchanging the handle 30 with a hitch 70 fitted at the top of the towing / steering arm 28.

Figure 4 shows a top view and figure 5 shows a bottom view of the welding cart. The pneumatic tires mounted on the wheels are referenced by numeral 40, these are attached to axels 52 which are attached to suspension arms 48 in the rear, while in the front the axels 52 are attached to steering spindles 56 which are then attached to suspension arms 48 and tie rods (left and right) 50. The handle 30 is attached to the towing / steering arm 28 which is mounted to the welding cart by a towing / steering arm mounting bracket 42. The base of the welding cart is referenced by the numeral 2 and the rotating platform for an electric welding machine is shown at 6. The welding flux container holder / spray bottle holder is shown at 20, tool bracket holder 22 and "E11" brackets to hold welding cables and / or hoses 24. The cart has centering brackets 34 for the welding gas bottle 8 in the lower section of the gas welding bottle holding frame 4. Skid plates 54 are provided to prevent damage to the axels from debris on the ground and a lower shelf screen 60 is also provided. A welding machine back stop 38 is mounted on the upper surface of the rotating platform 6 onto which the welding machine is bolted to prevent the welding machine from slipping off the platform. In figure 4 numeral 36 shows "U" brackets 36 which are used for "connected" or "in use" welding machine cables.

Figure 6 shows a front view of the cart. The pneumatic tires mounted on wheels are shown at 40. These are connected via axels 52 to spindles 56 (shown in figures 8 and 9 – not shown in this figure) to suspension arms 48 in the front while no spindles 56 are used in the rear. Reference numeral 50 shows the left and right tie rods which are connected from steering spindles 56 (shown in figures 8 and 9) to the towing / steering arm 42 mounting bracket. Numeral 46 shows the suspension spring upper / lower retaining cups. The

suspension spring rate can be changed by either adding or subtracting washers from the spring cups 46, which allows the user to tailor the stiffness of the suspension system depending on how much overall weight is being carried on the cart. The handle 30, for manual towing, is connected to the towing / steering arm 28 which is affixed to the cart by a towing / steering arm mounting bracket 42. The welding gas bottle holding frame 4 has at its upper end "E11" type brackets 24 to hang welding cables and / or hoses, tool holder brackets 22 and a welding flux / spray bottle container holder 20. Also visible in this figure are "U" shaped brackets 36 which are used for "connected" or "in use" welding machine cables, the rotating platform 6 for an electric welding machine and a locking handle 18 for the rotating platform 6.

Figure 7 shows a view from the rear of the cart. The reference numerals on this figure relate to the same components are those described above in relation to figure 6. Figure 7 additionally shows the lower mounting tube 14 for the platform 6, the upper mounting tube 16 as fitted into the lower mounted tube 14, the welding machine backstop 38 onto which the welding machine is bolted down to the rear of the rotating platform 6 to prevent the welding machine from slipping off the platform 6 and the removable retaining strip 26 in the gas bottle holding frame 4 for ease of bottle replacement.

Figure 8 shows the front suspension viewed from the front of the cart while figure 10 shows the rear suspension viewed from the rear of the cart. Figure 9 is a cutaway side view of the front suspension while figure 11 is a cut away side view of the rear suspension. A further explanation is given to the components below.

The base of the cart is referenced as numeral 2. The pneumatic tires mounted on wheels 40 are mounted on axles 52 and suspension arms 48 are mounted to the suspension arm mounting bracket 58. Steering spindles 56 are connected to both left and right tie rods 50 and front suspension arms 48. The suspension springs 44 have suspension spring upper and lower retaining cups 46. Suspension arm limit stops 62 are connected to the suspension arms 48. One of the rear springs can be removed from each side to allow different suspension rates.

Figure 8 additionally shows the towing / steering arm bracket 42 and the towing steering arm 28. Figure 9 additionally shows the welding cart lower screen shelf 60, the steering spindle 56, towing / steering arm mounting bracket 42 and the steering arm 28. Figure 11 additionally shows the skid plate 54. The skid plate 54 and the dual suspension spring mounting plates 64 are also shown in figure 10.

Figure 12 shows the removable retaining strip 26 and figure 13 shows the top end of the gas welding bottle holding frame 4 viewed from the back side of the cart with the removable retaining strip 26 removed. Also shown in more detail is the positioning of the “E11” type brackets 24 and the removable retaining strip 26 which is used in the welding gas bottle holding frame 4 for ease of bottle replacement. At either end of the removable retaining strip 26 are retaining pins 66. These pins 66, as shown in figure 13, are retained within retaining pin holders 68.

The removable retaining strip 26 shown in figure 14 shows once again the retaining pins 66 as defined in figure 12 above. This figure shows a top view of this part of the cart and also shown are the “E11” type brackets 24 to hang welding cables and / or hoses. Figure 15 shows a separate view of the “E11” type brackets 24 and how they are affixed to the retaining strip 26.

Both the lower part and the upper part of the gas welding bottle frame 4 are shown in figure 17 as viewed from above. The gas bottle holding frame 4 is shown holding a gas welding bottle 8 (shown in hashed lines). At the upper end of the frame 4 are shown the retaining pin holders 68.

Figure 18 shows a side view and figure 19 shows a front view of the upper end of the gas bottle holding frame 4. These figures show the welding flux container / spray bottle holder 20 which is attached to the upper part of the gas bottle holding frame 4. Reference numeral 24 refers to the “E11” type bracket supplied to hang welding cables and / or hoses and reference numeral 22 shows the tool holder brackets.

Figure 20 shows a side view and figure 21 shows an upper view of the welding flux container holder 20. This holder 20 may also be used to hold a spray bottle (not shown) filled with water to extinguish small fires if need be while welding or to cool off the metal and/or weld itself.

Figure 22 shows a front view of the handle 30 and figure 23 shows a side view of the handle 30.

Figure 24 shows the locking pin 32 for interchanging the handle 30 and the hitch 70 fitted at the top of the towing / steering arm 28. Figure 25 shows the towing / steering arm 28 with a hole 76 at one end which accepts the locking pin 32 shown in other figures for interchanging handle 30 and hitch 70 fitted at the top of the towing steering arm 28 and at the other end an axel bolt 74 (not shown) hole 72.

Figure 26 shows an expanded view of the towing hitch 70 which is interchangeable with the handle 30 if required and figure 27 shows an upper view of the towing hitch 70.

While this preferred embodiment of the invention has been shown and described, it will be apparent to those skilled in the art that various modifications may be made without departing from the spirit and scope of the present invention. For that reason, the scope of the invention is set forth in the following claims.